

ESTROGENICITY OF TREATED DOMESTIC WASTEWATER TO FISH

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Sewage treatment plants received natural and synthetic chemicals from urban and industrial discharges. These compounds can not be completely removed by treatment processes and can ultimately be released into the aquatic environment. Some of them are known to exhibit estrogenicity to aquatic animals, and so called xenoestrogens. The purpose of this study was to examine the estrogenic effects of effluent from a domestic wastewater treatment facility on an indigenous freshwater fish, tilapia. Fish were raised in aquariums and exposed to either filtered tap water (control), half strength (50% dilution) or whole effluent via a continuous flow system for 21 days. Estrogenic responses were evaluated based on expression of plasma vitellogenin (VTG) in fish using western blotting and quantified by an imaging analysis system. In addition, we also measured gonadosomatic index (GSI) and hepatosomatic index (HSI) to observed physiological effects of the fish. The results showed that only a short period of exposure to the effluent at both concentrations could increase VTG levels in fish of both sexes. The induction reached highest at the 21th day. The average GSI of treated females was slightly increased, while that of treated males was significantly smaller than that of the control males. The average HSIs of both sexes were higher than those of the controls, but not statistically different. This study indicates that estrogenic compounds are present in the effluent, and the concentrations of these chemicals were high enough to be responsible not only for the VTG induction but also physiological alteration observed in tilapia.